IN THE CLAIMS:

1. (Currently Amended): A system comprising:

at least one first conductive element and at least one second conductive element so disposed with respect to each other that, when the first and second conductive elements extend through a dielectric mismatch boundary, a first electromagnetic signal will induce a second electromagnetic signal to propagate along the second conductive element;

a transmitter operable to drive the first electromagnetic signal along the at least one first conductive element without also driving the at least one second conductive element;

a receiver for receiving the second electromagnetic signal from the at least one second conductive element, the received second electromagnetic signal being coupled to the at least one second conductive element in response to the at least one dielectric mismatch boundary; and

a coupler positioned at the dielectric mismatch boundary for coupling the second electromagnetic signal, the size of the received second electromagnetic signal being independent of dielectric properties associated with substances forming the dielectric mismatch boundary, wherein the coupler exhibits a length corresponding to at least one-quarter of a propagation velocity pulse length of the transmitted first electromagnetic signal.

2. (Previously Presented): The system of claim 1 further comprising a third conductive element surrounding at least part of the at least one first and second conductive elements and being connected to a ground plane.

3. (Previously Presented): The system of claim 1 wherein the at least one first and second conductive elements are positioned substantially parallel to each other and substantially perpendicular to the at least one dielectric mismatch boundary.

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1   4. (Previously Presented): The system of claim 1 wherein the at least one dielectric

2   mismatch boundary corresponds to a region associated with at least one first substance

3   having a first dielectric constant and at least one second substance having a second dielectric

4   constant.

1   5. (Currently Amended): The system of claim 1 wherein <u>at least one of</u> the <u>first and second</u>

2   electromagnetic ~~signal~~ <u>signals</u> exhibits an ultra-wideband frequency.

1   6. (Previously Presented): The system of claim 1 wherein the at least one dielectric

2   mismatch boundary corresponds to a transitional region between a gaseous substance and a

3   liquid substance.

1   7. (Previously Presented): The system of claim 1 wherein the at least one dielectric

2   mismatch boundary corresponds to a transitional region between at least two of a vacuum, a

3   gaseous substance, a liquid substance, a semi-solid substance, and a solid substance.

1   8. (Canceled):

1   9. (Currently Amended): The system of claim 1 further comprising a processing element

2   executing instructions to evaluate the ~~received~~ <u>second</u> electromagnetic signal relative to the

3   ~~driven~~ <u>first</u> electromagnetic signal to determine a characteristic of at least one substance

4   associated with the dielectric mismatch boundary.

1   10. (Currently Amended): The system of claim 9 wherein the processing element

2   communicates at least one of the attributes of the ~~received~~ <u>second</u> electromagnetic signal

3   and the characteristic of the at least one substance to a digital data processing device during

4   a communication session.

1   11. (Currently Amended): The system of claim 9 wherein the attributes at least one

2   attribute of the received second electromagnetic signal relative to the driven first

3   electromagnetic signal includes a time delay of the second electromagnetic signal relative to

4   the first electromagnetic signal and the characteristic of the at least one substance

5   corresponds to a level of that substance.

1   12. (Currently Amended): The system of claim 11 wherein the time delay attribute of the

2   received second electromagnetic signal relative to the driven first electromagnetic signal is

3   based, at least in part, on a time differential between signals associated with an equivalent

4   time sampling circuit of the receiver.

1   13. (Previously Presented): The system of claim 11 wherein the level corresponds to a

2   volume of fluid in at least one of an above-ground storage tank and a below-ground storage

3   tank.

1   14. (Previously Presented): The system of claim 1 wherein the at least one first and second

2   conductive elements form a parallel conductor transmission line structure.

1   15. (Previously Presented): The system of claim 1 wherein the at least one first and second

2   conductive elements are flexible.

1   16. (Previously Presented): The system of claim 1 wherein the at least one first and second

2   conductive elements exhibit quadrilateral cross-sections.

1   17. (Previously Presented): The system of claim 1 wherein the at least one first and second

2   conductive elements exhibit substantially identical cross-sections.

1   18. (Canceled):

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1   19. (Previously Presented): The system of claim 1 wherein the coupler operates as an

2   electromagnetic shunt path between the at least one first and second conductive elements.

1   20. (Canceled):

1   21. (Previously Presented): The system of claim 1 further comprising:

2   a float for positioning the coupler relative to the at least one dielectric mismatch

3   boundary.

1   22. (Previously Presented): The system of claim 21 wherein the float includes a buoyant

2   component and a weighted component.

1   23. (Currently amended) A method comprising:

2   driving a first electromagnetic signal on an at least one first conductive element

3   without also driving an at least one second conductive element, the first conductive element

4   and second conductive element axially separated and so disposed with respect to each other

5   that, when the first and second conductive elements extend through at least one dielectric

6   mismatch boundary, ~~a~~ the first electromagnetic signal will induce a second electromagnetic

7   signal to propagate along the second conductive element;

8   ~~at least partially circumscribing an area about the at least one first conductive~~

9   ~~element and the at least one second conductive element with a third conductive element~~

10   ~~connected to a ground plane; and~~

11   receiving, from the at least one second conductive element, ~~a~~ the second

12   electromagnetic signal induced by the first electromagnetic signal driven along the at least

13   one first conductive element, the second electromagnetic signal being coupled to the at least

14   one second conductive element in response to the at least one dielectric mismatch boundary;

15   and

16   evaluating a time delay of the second electromagnetic signal relative to the first

17   electromagnetic signal to determine a level of the substance.

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1   24. (Canceled):

1   25. (Canceled):

1   26. (Canceled):

1   27. (Previously presented) The method of claim 23 wherein the at least one first and second
2   conductive elements are flexible.

1   28. (Previously presented) The method of claim 23 further comprising:
2   providing a coupler positioned at the dielectric mismatch boundary for coupling the
3   second electromagnetic signal to the at least one second conductive element, the size of the
4   second electromagnetic signal being independent of dielectric properties associated with
5   substances forming the at least one dielectric mismatch boundary.

1   29. (Previously presented) The method of claim 28 further comprising:
2   providing a float for positioning the coupler relative to the at least one dielectric
3   mismatch boundary.

1   30. (Currently Amended): A method comprising:
2   driving a first electromagnetic signal on an at least one first conductive element
3   without also driving an at least one second conductive element, the first conductive element
4   and second conductive element so disposed with respect to each other that, when the first
5   and second conductive elements extend through at least one dielectric mismatch boundary, a
6   first electromagnetic signal will induce a second electromagnetic signal to propagate along
7   the second conductive element;
8   receiving, from the at least one second conductive element, a second electromagnetic
9   signal induced by the first electromagnetic signal driven along the at least one first

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10 conductive element, the second electromagnetic signal being coupled to the at least one

11 second conductive element in response to the at least one dielectric mismatch boundary; and

12 providing a coupler exhibiting a length corresponding to at least one-quarter of a

13 propagation velocity pulse length of the ~~transmitted~~ first electromagnetic signal, the coupler

14 positioned at the dielectric mismatch boundary for coupling the second electromagnetic

15 signal to the at least one second conductive element, the size of the second electromagnetic

16 signal being independent of dielectric properties associated with substances forming the at

17 least one dielectric mismatch boundary.

1 31. (Previously Presented) A system comprising:

2 a first conductive element and a second conductive element, axially separated and so

3 disposed with respect to each other that, when the first and second conductive elements

4 extend through a dielectric mismatch boundary, a first electromagnetic signal will induce a

5 second electromagnetic signal to propagate along the second conductive element;

6 ~~a third conductive element at least partially circumscribing an area about the first and~~

7 ~~second conductive elements and being connected to a ground plane;~~

8 a transmitter operable to drive the first electromagnetic signal along the at least one

9 first conductive element without also driving the at least one second conductive element;

10 ~~and~~

11 a receiver for receiving the second electromagnetic signal from the at least one

12 second conductive element, the received electromagnetic signal being coupled to the at least

13 one second conductive element in response to the at least one dielectric mismatch boundary;

14 and

15 a processor for evaluating a time delay of the second electromagnetic signal relative

16 to the first electromagnetic signal to determine a level of the substance.

1 32. (Currently Amended): A system for measuring distances, the system comprising:

2 a first conductive element and a second conductive element so disposed with respect

3 to each other that, when the first and second conductive elements extend through a dielectric

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4   mismatch boundary, a first electromagnetic signal will induce a second electromagnetic

5   signal to propagate along the second conductive element;

6   a transmitter operable to drive the first electromagnetic signal along the first

7   conductive element without also driving the second conductive element;

8   a receiver operable to receive the second electromagnetic signal;

9   a coupler positioned at the dielectric mismatch boundary for coupling the ~~received~~

10   <u>second</u> electromagnetic signal, the size of the received second electromagnetic signal being

11   independent of dielectric properties associated with substances forming the dielectric

12   mismatch boundary, wherein the coupler exhibits a length corresponding to at least one-

13   quarter of a propagation velocity pulse length of the first electromagnetic signal; and

14   a processor operable to determine, at least in part from a time delay between the first

15   and second electromagnetic signals, a distance associated with the dielectric mismatch

16   boundary.

1   33. (Previously Presented): The system of claim 32 wherein the first electromagnetic signal

2   exhibits an ultra-wideband frequency.

1   34. (Previously Presented): The system of claim 32 wherein the receiver is further operable

2   to detect the time delay between the first and second electromagnetic signals.

1   35. (Previously Presented): The system of claim 34 wherein the receiver includes an

2   equivalent time sampling circuit.

1   36. (Previously Presented): The system of claim 32 wherein the first and second conductive

2   elements form a parallel conductor transmission line structure.

1   37. (Previously Presented): The system of claim 32 wherein the first and second conductive

2   elements are flexible.

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1   38. (Previously Presented): The system of claim 32 wherein the first and second conductive

2   elements exhibit quadrilateral cross-sections.

1   39. (Previously Presented): The system of claim 32 wherein the first and second conductive

2   elements exhibit substantially identical cross-sections.

1   40. (Previously Presented): The system of claim 32 wherein the distance determined by the

2   processor corresponds to a dimension associated with an object.

1   41. (Previously Presented): The system of claim 32 wherein the distance determined by the

2   processor corresponds to a displacement between a plurality of objects.

1   42. (Previously Presented): The system of claim 32 wherein the distance determined by the

2   processor corresponds to an angular orientation.

1   43. (Previously Presented): The system of claim 32 wherein the distance determined by the

2   processor corresponds to a degree of pressure.

1   44. (Previously Presented): The system according to claim 32, wherein the coupler is

2   slidable along the first and second conductive elements for so coupling the first and second

3   conductive elements as to launch the second electromagnetic signal along the second

4   conductive element when the first electromagnetic signal reaches the position of the coupler.

1   45. (Currently Amended): The system of claim 46 44 further comprising a supporting

2   material for slidably receiving the coupler in a channel defined therein, the supporting

3   material maintaining a consistent displacement between the coupler and the first and second

4   conductive elements.

1   46. (Previously Presented): The system according to claim 32, wherein the first

2   electromagnetic signal propagates from a first end of the first conductive element toward a

3   second end of the first conductive element, and the propagation of the first electromagnetic

4   signal through the boundary will induce the second electromagnetic signal to propagate

5   along the second conductive element toward a first end of the second conductive element.

1   47. (Currently Amended): A method of measuring distances, the method comprising:

2   driving a first electromagnetic signal along a first conductive element without also

3   driving a second conductive element, where the first and second conductive elements are so

4   disposed with respect to each other that, when the first and second conductive elements

5   extend through a dielectric mismatch boundary, a first electromagnetic signal will induce a

6   second electromagnetic signal to propagate along the second conductive element;

7   receiving the second electromagnetic signal;

8   providing a coupler positioned at the dielectric mismatch boundary for coupling the

9   ~~received~~ second electromagnetic signal, the size of the received second electromagnetic

10   signal being independent of dielectric properties associated with substances forming the

11   dielectric mismatch boundary, wherein the coupler exhibits a length corresponding to at

12   least one-quarter of a propagation velocity pulse length of the first electromagnetic signal;

13   and

14   determining, at least in part from a time delay between the first and second

15   electromagnetic signals, a distance associated with the dielectric mismatch boundary.

1   48. (Currently Amended): The method of claim ~~49~~ <u>47</u> wherein the distance corresponds to

2   a dimension associated with an object.

1   49. (Currently Amended): The method of claim ~~49~~ <u>47</u> wherein the distance corresponds to

2   a displacement between a plurality of objects.

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1   50. (Currently Amended): The method of claim 49 47 wherein the distance corresponds to

2   an angular orientation.

1   51. (Currently Amended): The method of claim 49 47 wherein the distance corresponds to

2   a degree of pressure.

1   52. (Currently Amended): The method according to claim 49 47, wherein the coupler

2   couples the first and second conductive elements as to launch the second electromagnetic

3   signal along the second conductive element when the first electromagnetic signal reaches the

4   position of the coupler, and wherein the coupler is slidable along the first and second

5   conductive elements.

1   53. (Currently Amended): The method according to claim 49 47, wherein the first

2   electromagnetic signal propagates from a first end of the first conductive element toward a

3   second end of the first conductive element, and the propagation of the first electromagnetic

4   signal through the boundary will induce the second electromagnetic signal to propagate

5   along the second conductive element toward a first end of the second conductive element

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